

## 12-5 COMPLETE JOINT PENETRATION AND PARTIAL JOINT PENETRATION GROOVE WELDS

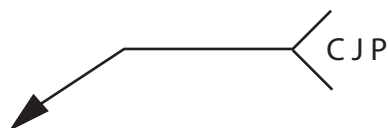
The Complete Joint Penetration (**CJP**) groove weld is a groove weld that extends completely through the thickness of components joined. The primary purpose for the use of the **CJP** groove welds is to transmit the full load-carrying capacity of the structural components they join. Most **CJP** welds require a specific edge preparation. The **CJP** welds should be used when deemed necessary, but should be kept to a minimum. Fillet welds are the preferred method of joining components owing to their overall economy, ease of fabrication and adaptability.

The Partial Joint Penetration (**PJP**) groove weld is a groove weld that does not extend completely through the thickness of components joined. The following **PJP** welds shall be prohibited:

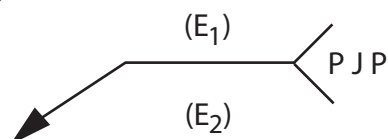
- **PJP** groove welds in butt joints except those conforming to AASHTO/AWS D1.5 (2002), Article 2.17.3 "Connections or Splices in Compression Members with Milled Joints" (AASHTO/AWS D1.5, 2002, Article 2.14).
- **PJP** groove welds where the applied tensile stress is normal to its effective throat (Caltrans BDS 2000, Table 10.3.1B Footnote c). Effective throat of a weld is the shortest distance from the joint root to its surface.

When a **CJP** groove weld or a **PJP** groove weld is used, the designer is encouraged not to detail specific groove details and not to call out the symbol for a specific weld type, i.e. a double-V-groove or square-groove. Instead, point the weld arrow to the joint location and call out **CJP** or **PJP** as shown in the following figures. The specific details are left to the Contractor/Fabricator. The Contractor/Fabricator is in the best position to choose the appropriate groove weld details in accordance with the current AASHTO/AWS welding codes for the welded joints in order to avoid undesirable effects such as excessive distortion based on the Contractor/Fabricator's experience and operational capacities.

The welding symbol without dimensions designates a **CJP** weld, as follows:

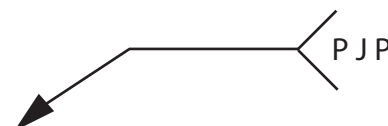


The welding symbol with effective weld size ( $E_1$ ) for other side and ( $E_2$ ) for arrow side designates a **PJP** weld, as follows:



The effective weld size of a **PJP** groove weld shall be the depth of bevel with or without a deduction of 3 mm (1/8 in.) (AASHTO/AWS D1.5, 2002).

The welding symbol without dimensions designates a **PJP** weld with minimum effective weld size as specified by the AASHTO/AWS D1.5 (2002) Table 2.2, as follows:



**Table 2.2 AASHTO/AWS D1.5 (2002)**  
**Minimum Effective Weld Size for PJP Groove Welds<sup>1, 2</sup>**

Base Metal Thickness of Thicker Part Jointed (T)	Minimum Effective Weld Size
$T \leq 20 \text{ mm (3/4 in.)}$	6 mm (1/4 in.)
$T > 20 \text{ mm (3/4 in.)}$	8 mm (5/16 in.)
Notes:  1. Smaller welds may be approved by the Engineer based upon applied stress and use of appropriate preheat.  2. Except that the weld size need not exceed the thickness of the thinner part.	



## Reference

AASHTO/AWS. 2002. *Bridge Welding Code*, AASHTO/AWS D1.5M/D1.5:2002, American Association of State Highway and Transportation Officials, Washington, D.C.

Caltrans. 2000. *Bridge Design Specifications*, LFD Version, California Department of Transportation, Sacramento, CA.

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